Study of jet quenching with Z+jet correlations in PbPb and pp collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02\,\mathrm{TeV}$

— Supplemental Material —

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A proper comparison between the data presented in this Letter and theory can be done when the theory calculations smear the generator-level jet p_{T} to the resolution observed in detector-level jets. The procedure is given below.

The $p_{\mathrm{T}}^{\mathrm{gen}}$ is smeared into $p_{\mathrm{T}}^{\mathrm{reco}}$ by multiplying the $p_{\mathrm{T}}^{\mathrm{gen}}$ with a number sampled from a Gaussian distribution with mean 1 and variance $\sigma^2(p_{\mathrm{T}}^{\mathrm{gen}})$. The functional form is the same for pp and PbPb :

$$\sigma\left(p_{\mathrm{T}}^{\mathrm{gen}}\right) = \sqrt{C^2 + \frac{S^2}{p_{\mathrm{T}}^{\mathrm{gen}}} + \frac{N^2}{\left(p_{\mathrm{T}}^{\mathrm{gen}}\right)^2}}$$

The parameter S describes the p_{T} dependence of the jet energy resolution, C represents the high-p_{T} limit of the resolution, and N reflects the effect of UE fluctuations on the energy resolution. The parameters for $\sigma\left(p_{\mathrm{T}}^{\mathrm{gen}}\right)$ are determined using PYTHIA+HYDJET (for PbPb) and PYTHIA (for pp) samples. The parameter C is determined only from the PYTHIA sample, and has the same value for pp and PbPb, 0.061 ± 0.001. The PbPb (pp) numerical values for S and N are 1.24 ± 0.04 (0.95 ± 0.01) and 8.08 ± 0.15 (0.001 ± 0.001), respectively.

Arguably a more accurate comparison would include the smearing of generator-level jet ϕ as well. However, simulation studies showed that, compared to jet p_{T} smearing, jet ϕ smearing has negligible effect on the observables presented and therefore is omitted in this guide.